A Study of the Oil from Sumac (Rhus glabra).

H. W. BRUBAKER.

Since the demand for fats has increased so greatly and their price has reached such a high level it has become imperative that we make use of all the available sources of this most important material. A great deal of the rocky waste land of Kansas and other states is covered with the common sumac (*Rhus glabra*). It occurred to the author to make a chemical study of the oil from the sumac seed to determine its fitness as a food or for industrial purposes, and the amount available.

The berries from which this oil was obtained were gathered at Manhattan, Kan., in February, 1919. The husks were removed from the berries by rubbing gently in a mortar and sending the material through a small fanning mill. The clean, air-dried seeds were ground in a mill and the fat extracted with dry ether in a continuous extraction apparatus large enough to hold two or three pounds of the material. Two determinations gave an average of 11.71 per cent of oil in the ground seeds. Table No. I summarizes the results of the physical and chemical examination of the oil:

TABLE No. I.

Determination number.	Sp. gr. at 150° C.	Index of refraction at 20° C. Abbe's refractometer.	Acid value.	Acetyl value.	Saponification number.	Iodine value.	Per cent of soluble fatty acids.	Per cent of insoluble fatty acids.
1.....	0.92568	1.4710	0.9	9.27	193.2	126.55	0.85	92.68
2.....	0.92587	1.4710	.....	9.20	193.8	126.98	0.67	93.55
3.....	.....	1.4710	.....	.....	190.8	.....	0.78	94.38
Average...	0.92577	1.4710	0.9	9.235	192.6	126.76	0.766	93.54

Table II gives the characteristics of the insoluble fatty acids:

TABLE No. II.

Melting point.	Solidification temperature.	Index of refraction.	Iodine value.
17° C.	6° C.	1.47°	121.8

The oil of sumac has a mild odor, pleasant taste and a deep yellow color. It is quite viscid at ordinary room temperature. Upon being cooled it thickens gradually until at —16° C. it has the consistency of soft vaseline. I did not cool the oil to its freezing point. G. B. Frankforter and A. W. Martin give the freezing point of the oil from *Rhus glabra*, gathered in Minnesota, as —24° C.*

* The American Journal of Pharmacy, vol. 76, p. 151; April, 1904.

These authors also found an iodine value of 87, which differs materially from that found for the Kansas oil, 126.76, shown in table I. The high iodine value would indicate that the oil should have fairly good drying qualities. This conclusion is substantiated by the results of comparative tests shown in table III:

TABLE No. III.

Oil Tested.	Percentage increase in weight in 7 days of a thin film of oil.	Rise in temperature on treatment with concentrated sulphuric acid.	
		Initial temperature.	Highest temperature.
Linseed oil	9.30	20° C.	94° C.
Sumac oil	1.66	20° C.	70° C.
Cottonseed oil	.65	20° C.	55° C.

A small amount of the oil mixed into a paste of the consistency of paint with sublimed white lead, and spread on a plate of glass, dried completely in three days.

It seems fair to conclude from the above study that sumac oil compares favorably with other vegetable oils, such as cottonseed oil and corn oil, in its chemical properties. It might readily find a use as an edible oil or in the soap-making industry, or as a semidrying oil in the paint industry, if it can be put on the market at a reasonable cost. Whether this can be done or not can be answered only by some vegetable-oil manufacturer becoming interested enough in the proposition to make a bid for the shipment of the seed.